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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/719,001	11/21/2003	Takashi Nagase	47434-00056	9074

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EXAMINER

JEFFERY, JOHN A

ART UNIT	PAPER NUMBER
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3742

DATE MAILED: 05/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/719,001	Applicant(s) NAGASE ET AL.	
	Examiner John A. Jeffery	Art Unit 3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 7, 9-22, 24-38 and 40-44 is/are rejected.
- 7) ☒ Claim(s) 5, 8, 23 and 39 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/21/04, 1/27/05</u> . | 6) <input checked="" type="checkbox"/> Other: <u>IDS filed 9/3/04, 4/29/05</u> . |

DETAILED ACTION

Title of Invention

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Soldering Iron Tip With Metal Particle Sintered Member Connected to Heat Conducting Core."

Claimed Subject Matter Not in Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP 608.01(o). Correction of the following is required:

The sleeve of the metal particle member extending into the passageway of the core claimed in claim 34 must be described.

Drawing Objections

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the sleeve of the metal particle member extending into the passageway of the core claimed in claim 34 must be shown or the feature(s) cancelled from the claims.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended

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replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 4 and 20 are objected to because of the following informalities:

Claim 4: In line 2, "have" must be changed to "having."

Claim 20: In the last line, "50 or" must be deleted as it is superfluous.¹

Appropriate correction is required.

¹ Because the examiner has interpreted the claim limitation in question as effectively reciting (1) a particle size of no greater than 50 microns, or (2) a particle size of no greater than 200 microns, the claim is sufficiently clear to the skilled artisan in light of the specification to avoid rejection under 35 USC 112, second paragraph. However, the 50-micron particle size limit is superfluous in view of the 200-micron size limit.

Claim Rejections - 35 U.S.C. § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 37 is rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention.

In line 2, no antecedent basis exists for "the tin alloy coating."

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 7, 11-14, 17-19, 21, 22, 24, 27, and 35 are rejected under 35 USC 102(b) as being anticipated by Weller (US 5,579,533). Weller (US 5,579,533) discloses a soldering iron tip comprising a copper core (copper rod) and metal particle sintered member comprising a mixture containing iron and copper particles. The mixture comprises 10-50 weight % iron particles (sintering base material) and 50-90 weight % copper particles (sintering additive). The metal particle sintered member is attached to the copper core (rod) to form a tip. See col. 4, line 43 – col. 5, line 26 and Figs. 3-4. See also the text of patent claims 1, 5, and 8 in col. 6 of Weller (US 5,579,533).

Regarding claims 11-14 and 18, see Fig. 3 and col. 4, lines 35-54.

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Regarding claim 19, Weller (US 5,579,533) discloses in col. 4, lines 53-54 that the tip can be "welded, silver soldered or bonded by sintering...." Such metal fusion bonding techniques inherently include brazing.

Regarding claims 21 and 22, the scope of the claim language did not preclude the metal particle sintered member comprising the "first layer" and the sintered bond noted above as comprising the "second layer."

Regarding claim 35, the scope and breadth of the term "iron cap" did not preclude the cap of Weller (US 5,579,533) that comprises up to 50 weight % iron particles.

Joint Inventors -- Common Ownership Presumed

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103, the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligations under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103.

Claim Rejections - 35 U.S.C. § 103(a)

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 6, 9, 10, 15, 16, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weller (US 5,579,533) in view of JP2000-317629. The claims differ from Weller (US 5,579,533) in calling for the metal particle sintered member to be only on a forward tip of the tapered portion. But localizing coated regions only on the forward tip of the tip's tapered portion is well known in the art. JP2000-317629, for example, discloses a soldering iron with heating element 4 and a copper core with a tapered tip. The tip comprises a copper core with an iron-nickel coating having a thickness of 50-500 microns only on the forward tip region 3 of the copper core. See Fig. 1(b). Such a technique ensures that the coating is used only where it is needed (i.e., in the workpiece-contacting area). In view of JP2000-317629, it would have been obvious to one of ordinary skill in the art to provide the metal particle sintered member only on a forward tip of the tapered portion of the previously described apparatus to ensure that the the sintered member is used only where it is needed (i.e., in the workpiece-contacting area).

Regarding claim 10, note the last line of the abstract of JP2000-317629.

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Regarding claim 12, Weller (US 5,579,533) discloses that the cap can be “silver soldered” to the copper rod to form the tip. See col. 4, lines 51-55. Although Weller (US 5,579,533) does not provide further details of the specific type of silver solder used to attach the cap to the rod, no criticality is seen in using “silver particle/powder paste” as claimed in lieu of the silver solder disclosed by Weller (US 5,579,533).

Claims 4 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weller (US 5,579,533) in view of Franklin (US 2,679,223). The claims differ from the previously cited prior art in calling for the iron particles to have purity no less than 99.5%. But providing pure iron particles for a sintered soldering iron tip structure is well known in the art. Franklin (US 2,679,223), for example, discloses providing pure iron particles (col. 4, lines 66-67) to coat an underlying core of pure copper. See col. 4, line 38 – col. 5, line 3. See also col. 6, lines 24-51. As noted in col. 4, line 54, the particles have an average size of 100 mesh (149 μ). Although the exact percentage of purity is not disclosed by Franklin (US 2,679,223), the “pure iron” particles in Franklin (US 2,679,223) are presumed to be substantially 100% iron, thus meeting the claimed purity percentage. As noted in col. 7, line 55 – col. 8, line 13, the particle size and nature of the metallic substances will affect the rate of thermal conductivity and rate of solubility of the tip. In view of Franklin (US 2,679,223), it would have been obvious to one of ordinary skill in the art to provide a tip with the claimed purity and particle size in the previously described apparatus to provide a tip with a high thermal conductivity and desired solubility rate.

Claims 25, 26, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weller (US 5,579,533) in view of Trowbridge (US 53,545). The claims differ from the previously cited prior art in calling for the conical tip member to interlock with a forward nub on the rear body member. But such an interlocking structure is well known in the art. Trowbridge (US 53,545), for example, discloses in Fig. 2 a conical tip member C that interlocks with forward nub "a" of rear body member B. Such an arrangement ensures firm engagement between the forward conical tip and the body member – even without additional fasteners. See col. 2, lines 9-12 of the specification of Trowbridge (US 53,545). In view of Trowbridge (US 53,545), it would have been obvious to one of ordinary skill in the art to provide an interlocking engagement between the conical tip portion and the body member in the previously described apparatus to ensure firm engagement between the forward conical tip and the body member – even without additional fasteners.

Claims 29, 31, 32, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weller (US 5,579,533) in view of Gleason (US 73,798). The claims differ from the previously cited prior art in calling for the core to have a threaded portion. But such structures are well known. Gleason (US 73,798), for example, discloses a core B comprising a female threaded portion (i.e., a "socket" or "cavity") into which a tip is screwed. Such a structure facilitates easily removing the tip for repair or replacement. In view of Gleason (US 73,798), it would have been obvious to one of

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ordinary skill in the art to provide a threaded portion in the core of the previously described apparatus to enable a tip portion to be screwed therein, thus facilitating easy removal of the tip for repair or replacement.

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Weller (US 5,579,533) in view of Crosby (US 62,941). The claim differs from the previously cited prior art in calling for the forward end member to have a rearward nub secured into the pipe. Securing tip members to cores via nubs, however, is well known in the art. Crosby (US 62,941), for example, discloses a tip member B with nub C that engages with corresponding recess in core A. Such an arrangement ensures firm engagement between the forward conical tip and the body member – even without additional fasteners. In view of Crosby (US 62,941), it would have been obvious to one of ordinary skill in the art to provide such an engagement between the tip and the core in the previously described apparatus to ensures firm engagement between the forward conical tip and the body member – even without additional fasteners.

Claims 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weller (US 5,579,533) in view of Christensen (US 3,358,897). The claims differ from the previously cited prior art in calling for the core to include a through-passageway and the metal particle sintered member to include a through-opening communicating with the passageway. Providing openings in conical tips that communicate with passageways in core members in bonding tools, however, is well

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known in the art. Christensen (US 3,358,897), for example, discloses a tip member 43 with opening 12 that communicates with an associated passageway in the core member 14. "Sleeve" 42 of the tip extends into a corresponding passageway in the core 14. See Fig. 2. Such a structure enables bonding material to pass through the opening to the workpiece, yet still provide a removable tip member. In view of Christensen (US 3,358,897), it would have been obvious to one of ordinary skill in the art to provide an opening in the tip and core in the previously described apparatus to enable bonding material to pass through the opening to the workpiece, yet still provide a removable tip member.

Claims 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weller (US 5,579,533) in view of Johnson (US 3,245,599). The claims differ from the previously cited prior art in calling for a top coating on the forward extension of the core, but not on a working tip end of the metal particle sintered member. But coating the entire area of a soldering iron tip except for its working tip end is well known in the art. Johnson (US 3,245,599), for example, discloses coating a tip with metallic coating 16 that resists wetting by solder except for working end 14. Such a structure not only increases tip life, but also ensures that solder does not adhere to areas of the tip other than the working end to protect the heating element and workpiece. See Fig. 7 and col. 3, line 54 – col. 4, line 5. In view of Johnson (US 3,245,599), it would have been obvious to one of ordinary skill in the art to provide a top coating that resists solder wetting on all tip areas except the working tip end in the previously described apparatus

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to not only increases tip life, but also ensures that solder does not adhere to areas of the tip other than the working end to protect the heating element and workpiece.

Regarding claim 37, although Johnson (US 3,245,599) does not disclose a tin alloy coating with good solder wettability, no criticality is seen in using tin alloys in lieu of the working tip end materials exhibiting good solder wettability in the prior art.

Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weller (US 5,579,533) in view of Johnson (US 3,245,599) and further in view of Kent (US 4,830,260). The claims differ from the previously cited prior art in calling for a sealing coating. But such sealing coatings are well known in the art. Kent (US 4,830,260), for example, discloses providing a sealing coating 14 disposed over iron layer 14. The iron layer 14 covers copper core 10. See Fig. 1. The sealing coating is electrically insulating to prevent electrical leakage from reaching the tip. See col. 1, lines 62-64 and col. 3, lines 60-66. In view of Kent (US 4,830,260), it would have been obvious to one of ordinary skill in the art to provide a sealing coating in the previously described apparatus to electrically insulate selected tip regions to prevent electrical leakage from reaching the tip.

Regarding claim 41, because Kent (US 4,830,260) teaches extending the coating to cover substantially the entire conical tip surface except for the working end (see Figs. 1 and 4 of Kent (US 4,830,260)), it would have been obvious to one of ordinary skill in the art to extend the top coating of the prior art to cover at least a rearward portion of

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the metal particle sintered member to ensure that only the working tip end (i.e., the area that contacts the workpiece) was uncoated.

Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weller (US 5,579,533) in view of Gleason (US 73,798) and further in view of Young (US 2,213,438). The claims differ from the previously cited prior art in calling for the cavity portion to have an Ag-Al-Cu and aluminum oxide layers. Providing a thin, heat conductive layer in a soldering iron tip cavity, however, is well known in the art. Young (US 2,213,438) discloses a thin, oxidation resistant liner 22 within the tip cavity to prevent oxidation yet still promote heat conduction. See Page 1, col. 2, line 40 – Page 2, col. 1, line 20. In view of Young (US 2,213,438), it would have been obvious to one of ordinary skill in the art to provide a thin layer in the tip cavity of the previously described apparatus to prevent oxidation yet still promote heat conduction. Although the liner 22 of Young (US 2,213,438) is preferably stainless steel, no criticality is seen in the use of Ag-Al-Cu and aluminum oxide as cavity layers.

Allowable Subject Matter

Claims 5, 8, 23, and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Other Pertinent Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant should (1) separately consider the art, and (2) consider the art together with the previously cited prior art for potential applicability under 35 U.S.C. §§ 102 or 103 when responding to this action. US 350, US 862, and GB 994 disclose tip structures relevant to the instant invention.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John A. Jeffery whose telephone number is (571) 272-4781. The examiner can normally be reached on Monday - Thursday from 7:00 AM to 4:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans, can be reached on (571) 272-4777. All faxes should be sent to the centralized fax number at (703) 872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "John A. Jeffery", with a stylized flourish at the end.

**JOHN A. JEFFERY
PRIMARY EXAMINER**

5/13/05